AMRAD NEWSLETTER

Amateur Radio Research and Development Corporation

September 1982

AMRAD Meeting

On Monday, September 20, 1982, we will meet at 7:30 P.M. at the Patrick Henry Branch Library, 101 Maple Ave East, Vienna, Virginia. Our speaker will be Bruce Brown, WA9GVK, who will talk on video security technology.

8273 HDLC Protocol Controller Chips

We now have another twenty 8273 ICs for use in Vancouver Terminal Node Controller (TNC) boards. These chips are available to experimenters and are free except for mailing costs. Restrictions are that they be limited to one per person, for personal use only, not for resale and for TNC boards that are being constructed in the near future (not for the indefinite future or for spares). If you would like one, please send us a letter to the effect that you agree to these conditions along with a check in the amount of U.S. $1 payable to AMRAD. The mailing address is 1524 Springvale Ave, McLean, VA 22101. All chips are believed to be good and have been checked by us in the WB4JFI/R TNC board.

Donation of Relay Rack Cabinet Sought

We are ready to begin installation of a remote receiver system in Rosslyn, Virginia and are in need of a 19-inch relay rack cabinet. It may be a cosmetic reject because it will be located in an elevator loft. Minimum requirements are at least 42 inches of vertical panel space and at least 12 inches of depth. Front and back doors would be nice-to-have features to permit locking the equipment. The donation will be tax-deductible. If you can contribute a suitable rack, please contact Paul Rinaldo, W4RI, 703-734-0878. We would also appreciate a volunteer to help with installation.

In This Issue...

You will find an article by Den Connors, KD2S, on the 6809 in packet radio. When you read it, please bear in mind that Den's talk was presented at the ARRL Amateur Radio Computer Networking Conference. The written version was completed later and is printed here for the record. This newsletter is being sent to everyone who either attended the conference or ordered copies of the proceedings. Den mentioned that some thought that the 6809 was overkill for a Terminal Node Controller board and therefore agreed to the selection of the 6502 in the inital TAPR TNC design. In practice, the 6809 turned out to be easier to program and was eventually selected for the Beta Test boards now being readied by TAPR.

AMSAT Annual Meeting

Being discussed between AMSAT and AMRAD is the possibility of a packet radio standards working session a day or two ahead of the AMSAT Annual Meeting which will be on Sunday, October 10. At this point, it hinges on the availability of some key players and a judgment call on whether or not the people will be ready to make their proposals and to agree on packet standards for the Phase III-B satellite to be launched in early 1983. We will be working this out with AMSAT and will let you know in the October AMRAD Newsletter.

Gaithersburg Hamfest

The 1982 Gaithersburg Hamfest will be expanded to two days: September 11 and 12 (Saturday and Sunday).

On Saturday there will be a full program at the Marriott Hotel which is located just outside the North Gate of the Montgomery County Fairgrounds. (The flea market and commercial exhibits will not be open on Saturday.) The Saturday program is as follows:

9:30 A.M. Kick-Off: Stuart Meyer, W2GHK, Chairman, 1982 FAR Hamfest

9:35 A.M. Technical Symposium: Paul Rinaldo, W4RI

9:40 A.M. **Packet Radio: Dave Borden, K8MMO and Terry Fox, WB4JFI.**

10:20 A.M. **AMSAT Phase II-B Satellite: Tom Clark, W3IWI and Jan King, W3GEY.**

11:15 A.M. **Cable TV Interference: Hugh Turnbull, W3ABC, Robert V.C. Dickinson, (E-COM Corp.), Wendell Bailey, KC3BO (National Cable TV Association).**

Forums

1:30 P.M. FCC Forum: Bill Grenfell, W4GF Moderator, Steve Lett, N4EKL (FCC/PRB), J. Jackson, AF40, (FCC/FOB), rep. from FCC Office of Science and Technology.

3:00 P.M. ARRL Forum: Hugh Turnbull, W3ABC, Director, ARRL Atlantic Division, Moderator; Don Search, W3AZD

6:00 P.M. Attitude Adjustment Party (cash bar)

7:00 P.M. Awards and Recognition Banquet

On Sunday, the gates to the fairgrounds will open at 0700. Drawings will be held hourly starting at 1000. The final drawing for all unclaimed prizes and major prizes will be at 1500. Winning tickets for lst, 2nd, 3rd and 4th prizes need not be present. These prizes will be shipped to winners not present. Major prizes are: ICOM IC-740, Kenwood TR 2500, Two EIMAC 3-500Zs, Bird Model 45 Wattmeter with choice of element.

Prices are:

All day Sunday Hamfest (Sep. 12 only)	$4.00
Saturday Sessions (Sep. 11 only)	4.00
Combination (Saturday/Sunday)(order in advance from Stu Meyer, W2GHK, 2417 Newton St, Vienna, VA 22180, or purchase at the Marriott on Saturday Morning)	7.50
Saturday Banquet (In advance)	20.00
(At door if any left)	22.50
Indoor Flea Market Tables	6.00
Tail Gating Spaces	5.00

The talk-in station, W3PRL, will be on 146.52 MHz simplex. The following repeater frequencies may also be used: DC area - 146.64, 146.79, 146.88 and 146.91. Gaithersburg - 146.955, 448.6. Frederick - 146.73. Baltimore: 146.67.

PROTOCOL

David W. Borden, K8MMO
Rte 2, Box 233B
Sterling, VA 22170
703-450-5284

Terry Fox continues to work on the AMRAD contribution to the AX.25 project, the level-two protocol requirements document. Gordon Beattie, WB2CAM has just begun to work on the New Jersey portion of the project, the level-three protocol requirements document. These documents grow out of AMRAD's continued dialog with Eric Scace, K3NA, the X.25 standards authority locally. Eric has been a great help to us in this regard, answering our every objection with X.25 can-do.

AMRAD has received another batch of 8273 protocol controller chips for distribution on a not-for-sale basis (see page 1 for details). Terry Fox has been checking them out to make sure they work. This one item lowers the price of getting on packet quite a bit. I do not expect the Vancouver board to become redundant as we continue in our quest for the perfect protocol. Eventually something will have to be built to handle 56 kb/s (a pleasant thought!), but until then, Vancouver is just fine. I still have the boards on consignment at $30 per board plus shipping.

I have had occasion lately to study some government networks and their command structure, that is, how do you get on the network, obtain network services and get off. I have been drawn to applications because the local-area network is undergoing change, and it will be a while before the requirements document is produced and the coding starts.

There are two applications that radio amateurs can reasonably be expected to want from their network right away. One is interactive communications with some remote user, and another is file transfers from some host computer. We need to develop a command language to accomplish these ends. The computer running the program that accepts these commands will allow local users to get onto the network. I suggest that the following commands might be useful:

ACCEPT - To accept a remote connection

CLOSE - To disconnect a remote connection

CONNECT-TO - To establish a system-level network connection

DISCONTINUE - To cease montioring

FTP - To enter the File Transfer Protocol subsystem

HELP - List currently available commands

LOGIN - To inform the remote-area users that you are available for connection

LOGOUT - To inform the remote users that you are shutting down your station

MONITOR - To commence observing all remote network traffic (currently a PAD board option). This requires careful thought as to what we really want to monitor at the network level.

RESUME - To resume a system level connection after having lost it somehow (host went down?)

SET - To set a parameter for a session

- FLOW CONTROL
- PAGE SIZE
- NEW PAGE COMMAND
- COMMAND LEVEL
- ECHO or NOECHO
- REPLY TERSE
- REPLY VERBOSE
- CONNECTION LEVEL (CHAR/LINE/BLOCK/STREAM)

SHOW - Display local information

STATUS - To check on the availability of remote hosts

- NEWS
- USERS
- TIME
- DATE
- MODE

WITHDRAW - To stop listening

Thus we see the kinds of things we need to do to use the network. Locally of course, we do not need to go thru this network computer. We can connect up to someone in the local area without the benefit of any help from other computers. If someone in the local area has a host computer available for use, you can connect directly. But, if you want to get outside the local area, then you need the services of the smart computer to get into the big network.

Next month we can investigate this concept further by looking at a terminal emulator running in our ham shacks that uses the file-transfer services to get a file from a remote host.

Digital Group Z80 System for Sale

All equipment in DG brown cabinets. Z80+ CPU, Motherboard+ (with all sockets) and Dual Density Controller III by RW Sales. CPU has on-board CMOS clock-calendar and 2708/2716 EPROM boot pages with un-ROM control. Two SA-800 floppies, 2 32-k Bell Controls static memory, Centronics 737 printer, 9-in. monitor, Keytronics Selectric-style keyboard. $2800. You ship.

Digital Group Z80 system boards for sale:
Z80 CPU with all mods, for DG SD disk controller.
TVC-64 video and Suding audio tape interface.
3 8-k static memory cards.
1 I/O card for system.
Standard motherboard with sockets.
Phi-deck controller, Rev C, factory built.
4 Triple-I Phi drives, 2 in DG cabinet.
Power One supply (HD5-12/ovp) for 5V, 12A.
Power One supply (HBB15-1.5) for low current.
All for $500. You ship.

Pat Snyder, 2001 Brenner Ave W, Roseville, MN 55113, 612-636-5103.

Ultronic Data Pump 202/1200 Modems for Sale

Bell 202-compatible modems, with built-in power supplies, $40 each. For local pick up. Documentation available. Paul Rinaldo, W4RI, 703-734-0878.

Two-Meter Equipment Sale

Drake TR-33C, VoCom 30-watt class-B amplifier, 12-V 4-A regulated power supply, and 7-element Yagi for sale. Hal Feinstein, 703-524-9116 eves or weekends.

Radio Shack Color Computer Software Info Needed

I am looking for info on programs for AMSAT orbits, packet radio, and PASCAL language for my Radio Shack Color Computer. I have the Clay Abrams 64-k conversion in it. Dick Davies, K3SPI, 2829 Bedford St., Johnstown, PA 15904.

The 6809 in Packet Radio

Den Connors, KD2S
4708 West Wild Horse Drive
Tucson, AZ 85741

Experiments are underway in Tucson by the author to develop a multipurpose Amateur Packet Radio using a 6809-based microprocessor system. The design target is a single-board microprocessor-controlled transceiver board, with self-contained multiprotocol capability and a synchronous/asynchronous modem. Up to three radios may be time-domain multiplexed, allowing gateway experiments, local area nets and long-haul networking. Initial hardware will include multiple transmitter-receiver control hardware, and a synchronous protocol communications controller. Software to drive these devices, as well as a simple network-level program for protocol conversion to and from local nets and backbone links is in the planning stages. The system will be compatible with the current VADCG synchronous protocol.

This paper describes current efforts to build a multifunction packet radio, based on design efforts begun in New York in 1980. Impetus for this design came from a presentation given at ARRL headquarters that summer by Larry Keyser, VE3QB, and his group, demonstrating their 220-MHz 9600 b/s packet transceivers (through coax -- not on the air). Initial efforts were begun at Rensselaer Polytechnic Institute (R.P.I.), with Howard Lester, W2ODC and Bill Patmos, W2DHT of Schenectady General Electric. A change of position and a move brought the author to Tucson, where efforts continued.

The target system, the basic digital radio, is shown in Fig. 1. The user sees the system through its terminal port, which interfaces to the on-board microprocessor. Serial data streams, shown as ASCII lines on the drawing, connect to digital modulators and demodulators, and then to the transmitter and receiver. The specifics of the type of ASCII data stream, modulation mode and transmit-receive control help to determine the type of service obtainable from any packet radio.

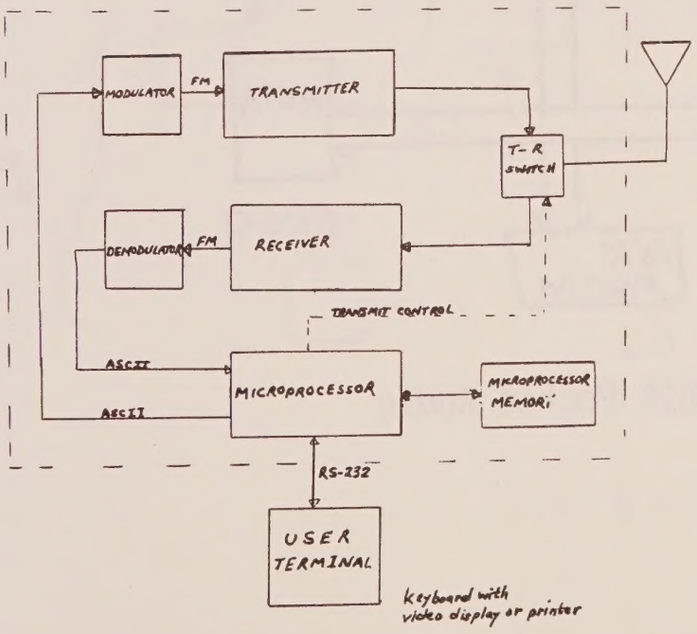

Fig. 1 - Basic Digital Radio

The basic design may be fabricated with 68-series MOS-technology devices, and a first approach is shown in Fig. 2. The microprocessor chosen is the 6809, both for throughput and availability considerations. Various ICs are available in the 68 line to perform the control and interfacing functions, and the chips required for communicating are shown. The terminal connects via the Asynchronous Communications Interface Adapter (ACIA), the 6850. Parallel lines are used for control and are handled by the Peripheral Interface Adapter (PIA), 6820. The Synchronous Protocol Communications Controller (SPCC) handles the serial data stream using the High-Level Data Link Control (HDLC) protocol for connecting multiple radios to the same channel.

Special considerations should be given the nature of the connection between the SPCC and the rf parts. This chip requires a lot of on-board circuitry to make a data stream that contains clocking information (within so-called Non-Return to Zero Inverted [NRZI] format), and an alternative chip might be used. The modulator and demodulator may be built from sophisticated Exar 2206 and 2211 ICs, and a 1200-baud modem has been sucessfully breadboarded, with Bell-202 modem compatibility.

Note a special difference between this diagram and that of the basic digital radio: the PIA handles multiple transmit, receive and T-R switching lines as well as carrier detect and external controls. This is a required hardware modification to allow linking different packet radio networks and is a fundamental difference between this terminal node controller (TNC) and others.

Construction of the packet radio hardware is unfortunately only a first step to implementation. Software must be written to support a channel utilization protocol. The protocol choosen to shoot for has a design parameter compatibility with other packet radios, so the multiple-access carrier-sensing radio protocol was chosen, with the ability to detect collisions of packets (CSMA/CD). The developmental systems to create the target software exist at the Kitt Peak National Observatory and consist of an SWTPC 5/09 microcomputer on an SS-50 bus. The FLEX operating system provides basic file handling and debugging tools and allows the use of an excellent real-time control language, FORTH.

Initial uses of such a radio were first determined at R.P.I., and several types of channels were investigated. Fig. 3 shows a synopsis of the type of links which could be available at a single site. In addition to the basic station and terminal at the control point, links may be made to remote hosts, in this case the mainframe at the R.P.I. Computer Center. A digipeater may exist for higher-speed packetized digital radios as well as an input on a regular repeater for stations with terminals and modems, but no packet radio TNC board. The control station would have to perform packetization of the latter type of input before retransmitting the messages over the packet links.

Multiple links in other directions to other packet radio nodes are also shown. A lot of regional effort will be required to set up types of links, and discussions like this symposium will no doubt handle the many sticky interfacing problems which invariably will crop up between sets of packet groups.

The creation of the Tucson Amateur Packet Radio group (TAPR) delayed the building of the multiport terminal node controller. The group is currently designing a second-generation local area net TNC, and all efforts will be focused on that system until it is finished.

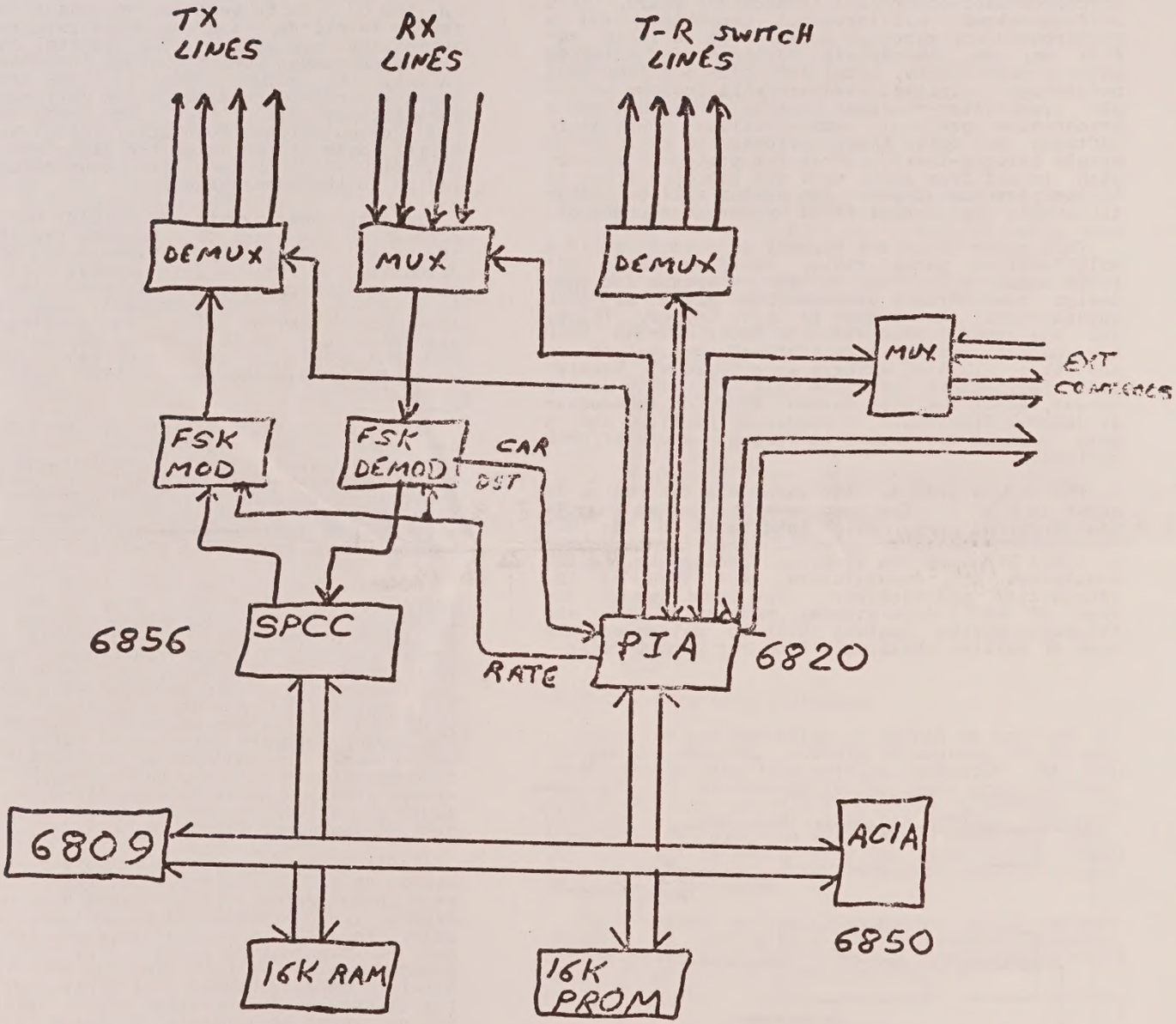

Fig. 2 - KD2S Packet Radio

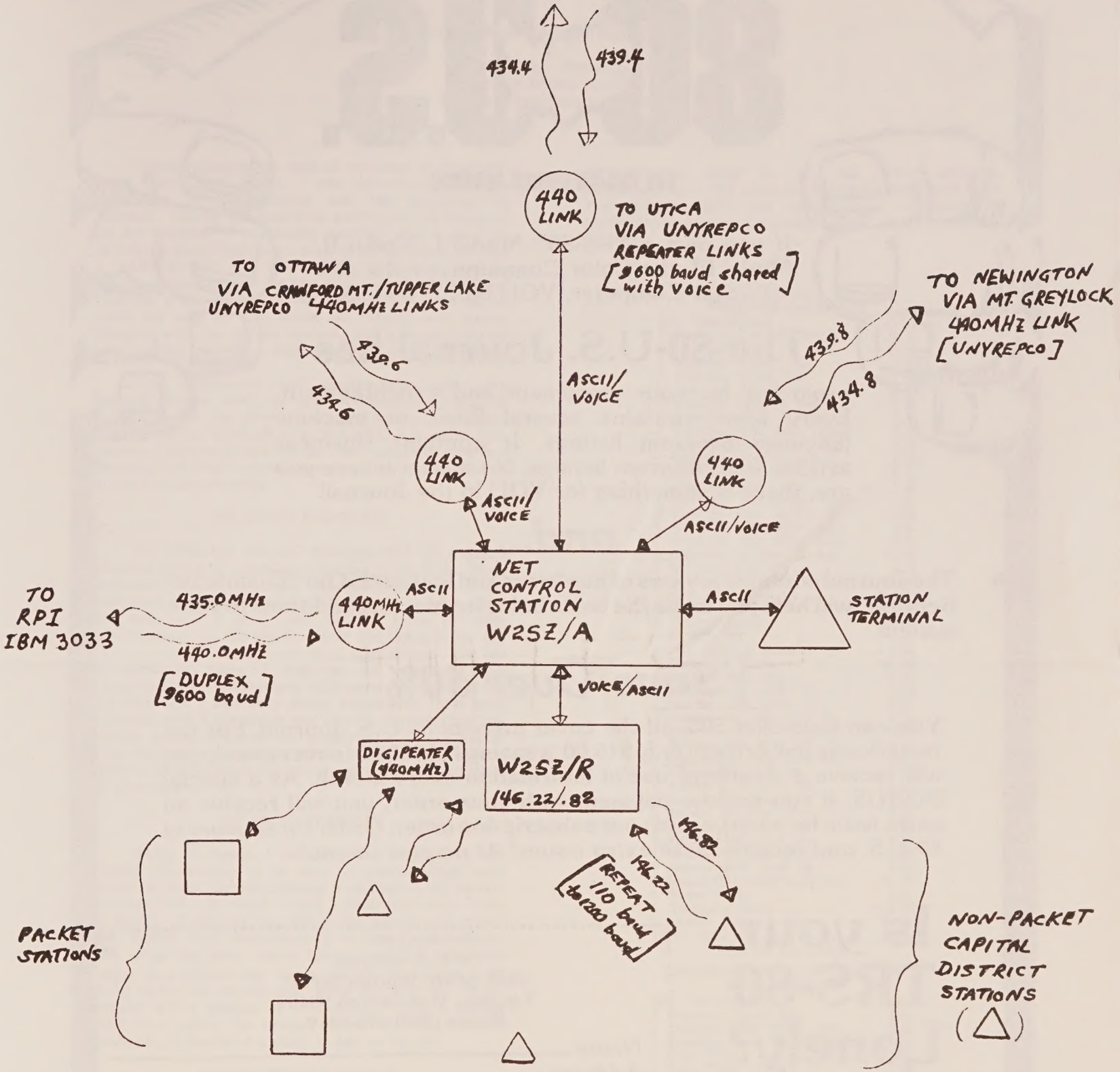

Fig. 3 - R.P.I. Links

A CHEAP HF PACKET RECEIVER

LCDR R.E. Bruninga
USS BLUE RIDGE (LCC-19)
FPO San Francisco, Ca. 96628

Having spent a few days of my leave visiting with Paul, Terry and Sandy, I was enthralled with the excitment of Packeteering and the potential for AMNET. Having watched Paul working on the design of an HF modem, I was really excited when I saw the article by Doug DeMaw on page 29 of the June QST for a BARE-BONES CW SUPERHET. The receiver he describes can be built for less than a hundred bucks and features a 260 Hz bandwidth crystal filter. It can be built for any of the bands 40 meters and above. Coupled with the proper modem, this modest receiver could be the basis for a dedicated HF Packet Receiver.

The schematics and construction hints are covered rather well in the article, so I ordered information on the circuit board and parts kit available from CIRCUIT BOARD SPECIALISTS, P.O. BOX 969, Pueblo, Colorado 81002. What I am including here is a summary of their information for anyone else who is excited by this project.

RECEIVER PARTS KIT

The CIRCUIT BOARD SPECIALISTS kit includes all parts and even a rudamentary box to put it in. Their complete kit cost is simply the numerical sum of the individual component parts cost; thus, indicating that the user with a good junk box, or plans to make modifications to the basic circuit need only order the parts necessary for his immediate application. The list of parts in table 1 excludes all resistors, disc capacitors, the rudimentary PCB case, Vernier dial for the VXO and a few very minor connectors. The total parts kit with VXO option was $84.70. By omitting the readily available parts, my total cost was only $56.30 They will pay the postage on all orders over $10, and offer a 10% discount for group purchases of quantities of 10 or more.

HF PACKETEERING

Being in Japan, I am not close enough to the Packet Community to be able to predict which band would be ideal for establishing a dedicated HF packet network, but I do recall seeing a band plan while I was at Paul's. I will let him fill in the details. It seems that rather than concentrating on long haul packets, that using the lower bands for shorter 200 mile hops might be a logical way to go. In the meantime, I am going to buy my crystal and build my receiver for the popular RTTY portion of 20 meters. Using a narrow shift TU or one of the several converted ASCII modems available, it should be a cinch to get on the air.

DEDICATED BLACK BOX

The big advantage of using a dedicated board is getting the project disconnected from the rest of the hamshack. While I was participating in the early ASCII experiments in 1979, I found it most frustrating to constantly have to reconfigure my entire computer and VHF/HF set up each time someone wanted to try something on the air. Once I would get all tuned up on the HF autostart frequency, something would come up and away I would go. My impression of the spirit of packet radio is to have a black box which is my medium through the ether to all the other amateur computerists. I will write another quick note once I get the receiver built and operational. I would be interested in hearing from anyone else who pursues this project.

Table 1 -
RECEIVER PARTS LIST

Qty	Description	Price
1	Board Bare Bones Receiver	$8.50
1	Set Case Parts	$9.25
2	Capacitor .001mf Disc	$.30
5	Capacitor .01mf Disc	$.75
8	Capacitor .1mf Disc	$1.60
3	Capacitor 10mf 16 Volt R	$.75
2	Capacitor 180pf Silver Mica	$.80
2	Capacitor 18pf Silver Mica	$.60
1	Capacitor 1mf 50 Volt R	$.20
1	Capacitor 2.2mf 50 Volt R	$.20
1	Capacitor 22mf 16 Volt R	$.25
3	Capacitor 270pf Disc	$.60
2	Capacitor 33pf Silver Mica	$.60
3	Capacitor 47mf 16 Volt R	$1.20
2	Capacitor 56pf Silver Mica	$.60
2	Capacitor 68pf Silver Mica	$.80
2	Capacitor Trimmer 3-68pf	$5.50
1	Ft. Coax RG174	$.15
1	Connector BNC Panel Mount	$1.00
3	Core L57-2 Variable	$10.80
4	Crystal 3.579 MHZ	$10.00
2	Diode Schottky	$1.00
1	IC LM 741	$.70
1	Jack Miniture Phone	$.50
3	Jack RCA Phono	$1.50
1	Knob .5 Inch Dia.	$.65
1	Resistor 1.5K .25W 5%	$.10
1	Resistor 1.5M .25W 5%	$.10
7	Resistor 100 Ohm .25W 5%	$.70
5	Resistor 100K .25W 5%	$.50
3	Resistor 10K .25W 5%	$.30
1	Resistor 120 Ohm .25W 5%	$.10
3	Resistor 1K .25W 5%	$.30
1	Resistor 2.7K .25W 5%	$.10
1	Resistor 270 Ohm .25W 5%	$.10
1	Resistor 330 Ohm .25W 5%	$.10
1	Resistor 33K .25W 5%	$.10
2	Resistor 47K .25W 5%	$.20
1	Resistor 560 Ohm .25W 5%	$.10
1	Resistor 820K .25W 5%	$.10
1	Resistor PNL MNT MIN 10K	$1.75
1	Socket 8 Pin	$.25
5	Transistor 40673	$10.50
1	Vernier Dial 1.5 Inch	$4.25
10	Ft. Wire Ena. No. 28	$1.00

Price For Kit...$79.45

VARIABLE CRYSTAL OSCILLATOR
20 OR 15 METER

Qty	Description	Price
1	Capacitor .01mf Disc	$.15
2	Capacitor 33pf Silver Mica	$.60
1	Capacitor Panel Mount 75pf	$7.50
1	Core T50-6	$.60
1	Core T50-6 (T1)	$.60
1	Diode 1n 914	$.10
1	Inductor 100uh	$1.00
2	Lock Washer No. 4	$.10
2	Nut 4-40	$.10
1	Resistor 100 Ohm .25W 5%	$.10
1	Resistor 100K .25W 5%	$.10
2	Screw 4-40 X .5 Inch	$.10
2	Screw 4-40 X .25 Inch	$.10
1	Socket Crystal	$1.00
1	Transistor 40673	$2.10
10	Ft. Wire Ena. No. 26	$1.00

Price For Kit...$15.25

SPREAD SPECTRUM

Hal Feinstein, WB3KDU
1410 Rhodes St. North
Arlington, VA 22209
703-524-9116 home

Civilian Uses of Spread Spectrum

Spread spectrum is currently enjoying a wave of popularity mainly within military circles. It seems that almost every major system that is being acquired today has some spread-spectrum element in it. You can find spread-spectrum modulation as popular as ssb in some cases. The military, of course, was not the ones who first brought spread spectrum to the civilian domain. To this end, we must credit NASA, who employed this mode for ranging of spacecraft.

Currently, civilian applications of spread spectrum are mainly involved with ranging, as in the Del Norte position-fixing system, and in aerospace. An interesting aerospace application is the use of process gain in a spread-spectrum system to make up for gain lost by using smaller earth-station antennas. Because one of the main costs in producing ground terminals for satellite communication is the antenna, any reduction in size also means a substantial reduction in cost of the earth station. But a smaller antenna size also means a drop off in gain. This gain must be made up in some other way.

A ground station can use process gain to offset the gain lost in reduction in antenna size. Such a system is currently operational on the West Coast, being employed to distribute teletex-style news copy. An added advantage to the operator is that the spread-spectrum transmission doesn't prevent the satellite transponder from being used by other narrowband systems as well. This is a plus for the low spectral density of spread spectrum.

There are some proposed uses of spread spectrum which have not hit the street quite yet. One interesting application, which is being proposed by Hewlett-Packard, is the use of a small direct-sequence transceiver of a few milliwatts to allow internal communications from a central computer to data terminals within the same facility. The terminals each have unique codes which act much as a privacy address. Such terminals would be connected only to a source of power and need no hard connection to a local-area network.

The Hewlett-Packard approach has its initial design aimed at the uhf ISM bands for the low-powered spread-spectrum signals. Another use of spread spectrum along similar lines but within a coaxial cable is to hook various robot sensors and "limbs" to a local-area network. Each sensor or limb would have a unique code. The approach is designed not so much to take account of spread spectrum's unique sharing capability but to provide a high degree of noise immunity. This invention is aimed at factory automation in which very high levels of shot and burst noise from the shop floor is the rule.

Spread spectrum has found its way into packet radio. Spread spectrum allows each node to have a unique code which acts as a hard address. Another node in the system can send data to that node by encoding that data with the spread spectrum address for the receiving node. Traffic for other nodes does not interfere because it would have a different code. Among the reasons cited for employing spread spectrum for packet switching are privacy, selective addressing, multipath protection and band sharing. But it is interesting to note that a load is taken off the contention collision approach because now a single frequency is not in contention among the nodes wishing to transmit. The load is divided among different node addresses, and each that is interested in sending data to a target node competes for that node only.

Here is one final approach that you might enjoy. One cable operator has decided to try to use spread spectrum to transmit top-ten rock music albums to subscribers. To prevent pirating and to keep the cable band space free for narrowband signals, he is using spread-spectrum direct sequence with a key to decoding the signal distributed every two weeks in the mail!

It's a Jungle out There

It is distressing to read in various amateur (and professional) journals the restatement of various myths that have grown up around spread spectrum. Certainly reasonable amateurs when supplied with the real facts on spread spectrum will see this as another experimental mode -- not as a legal jammer, invisible transmitter or the unbreakable coding system.

The FCC has plans to introduce spread spectrum as a normal amateur mode, above 50 MHz. We hope that any operating procedures mandated will not be at the expense of experimentation. It is our belief that experimentation will allow amateurs to develop proper operating habits to protect other users. This process will be furthered by getting validated information to the amateur community through various amateur publications.

AMRAD to Talk at MILCOM '82

Hal Feinstein, WB3KDU and Paul Rinaldo, W4RI were invited to speak at the 1982 IEEE Military Communications Conference in Boston on October 20. The paper, entitled "Spread Spectrum Experiments for Civil Applications," will review AMRAD's on-the-air experiments with spread-spectrum systems which were conducted under a Special Temporary Authority from the FCC.

Spread Spectrum at the ARRL National Convention

WØIYH gave a talk on "Spread Spectrum Applications for Amateur Radio" at the ARRL National Convention in Cedar Rapids in July to an audience of 100 or more. He sent us several copies of an excellent handout. You might be able to talk him out of a copy by writing William Sabin, M/S 137-138, CTPD, Rockwell International, Cedar Rapids, IA 52498.

THE DEAF AND THE TTY

Barry Strassler, Executive Director
Telecommunications for the Deaf, Inc.
814 Thayer Avenue
Silver Spring, MD 20910
301-589-3006 (Voice/TTY)

More on Line 21

I hope that I am not viewed as a person who continues to overdo an issue or to flog a dead horse. My continuing bone of contention is the Line 21 controversy which is, indeed, an issue that has infuriated the deaf community.

Very recently I bumped into Bob Bruninga, at home on furlough. He remarked that he has enjoyed reading my monthly column in this publication. I told him that I have come a long way in the vast world of telecommunications in the past three years, since I began my present position. With this in mind, I reviewed my past articles to compare with my recent findings. And I do wish to make some clarifications, lest a knowledgeable TV expert may trip me up.

I find that the word compatibility is very misleading. To some, compatibility means that two different systems are able to share the same conduit. As an analogy, a Chevrolet and a Rolls Royce are dissimilar when comparing their engine specifications. But both vehicles are compatible in that they ride down Main Street side by side, or rather bumper by bumper. But when mechanics attempt to interchange parts between cars, then both are incompatible.

To other people, compatibility means the ability to interact with each other. A black box converter makes Bell 103 ASCII users interface with deaf modem Baudot users. This is compatibility. And, I prefer this latter interpretation. Others look on it differently.

I have met many engineers and technicians in the TV industry, and they would give me different answers to the same questions. But when one dissects the answers, then they are basically correct. The question should not be "Is Line 21 compatible with Teletext?" It should be "Is Closed Captioning System compatible with Teletext?" and furthermore, "Can Teletext function on Line 21?" Teletext can coexist on Line 21 with the Closed Captioning System. But Closed Captioning viewers cannot pick up Teletext captioned programs unless a special "black box" has been devised. And this particular black box has not yet been devised. But it does not mean that it cannot, engineers point out to me. One engineer went one up by saying that even if Teletext is used on Line 15, this black box can pick up captioning signals and convert them for the befefit of Closed Captioned Line 21 audience.

At any rate, the bottom line is -- what are the true intentions of CBS on their Teletext/captioning plans?

Disabled SIG of San Diego Computer Society

The 3-month-old Disabled Interest Group, SDCS, with 50 members sent us greetings. They have organized into 6 sub-groups; (1) commmunications (computer networks, etc.), (2) education, (3) home environmental control, (4) career/job enhancement, (5) intro to computers for novices, and (6) problem solvers. 25% are disabled, including deaf, blind, wheelchair-bound or without one or more limbs. SIG members also include engineers, computer hardware manufacturers, computer store owners, software specialists and specialists who work in social and medical areas of the handicapped community. They have excellent relations with the San Diego Community Service Center for the Disabled. AMRAD will be happy to exchange newsletters with this group and look for other areas of cooperation. Their point of contact is Barbara E. Sack, 2596 Escondido Ave, San Diego, CA 92123.

AMRAD **Amateur Radio Research and Development Corporation**

Membership Application/Renewal

Mail to: Dr. William P. Pala, WB4NFB
5829 Parakeet Drive
Burke, VA 22015

See reverse for overseas mailing rates.

	Annual	Life
Dues: Regular	$15	$180
2nd in family same adr	8	96
Full-time student	5	-

Please make checks payable to AMRAD.

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Ham Call_____ Home Phone( )_____

Address_____
City,
State/Prov_____ ZIP/PC_____

Class License_____ ☐ARRL Member
Interests:
☐Packet Radio ☐Spread Spectrum
☐RTTY ☐Deaf TTY
Computer model_____
Microprocessor type_____

I agree to support the purposes of the Corporation.

*Signature*_____

The Amateur Radio Research and Development Corporation (AMRAD) is a worldwide club of over 500 amateur radio and computer experimenters. It is incorporated in Virginia and is recognized by the U.S. Internal Revenue Service as a tex-exempt scientific and educational organization.

The purposes of AMRAD are to: develop skills and knowledge in radio and electronic technology; advocate design of experimental equipment and techniques; promote basic and applied research; organize technical forums and symposiums; collect and disseminate technical information; and, provide experimental repeaters.

Meetings are on the 1st Monday of each month at 7:30 P.M. at the Patrick Henry Branch Library, 101 Maple Ave E, Vienna, VA. If the first month is a holiday, an alternate date will be announced in the newsletter. Except for the annual meeting in December, meetings are normally reserved for technical talks - not business.

WDRIWG/R is an open repeater for digital communications (including RTTY), voice and experimental modes. It is located at Tyson's Corner, McLean, VA. It features semi-private autopatch available to licensed members. Frequencies are: 147.81 MHz in, 147.21 MHz out. The repeater director is Jeff Brennan, WB4WLW, 7817 Bristow Dr, Annandale, VA, 22003, 703-354-8541.

The AMRAD CBBS, 703-734-1387, is operated by Terry Fox, WB4JFI. The system accepts 110, 300, 450 and 600-baud ASCII, Bell 103.

Handicapped Education Exchange, 301-593-7033, is operated by Dick Barth, W3HWN. HEX accepts both 110/300-baud ASCII and deaf TTY callers.

AMRAD is affiliated with the American Radio Relay League (ARRL), the Foundation for Amateur Radio (FAR), the Northern Virginia Radio Council (NOVARC) and the Mid Atlantic Repeater Council (T-MARC).

The AMRAD Newsletter is mailed monthly to members and other clubs on an exchange basis. Technical articles, product announcements, news items, and other copy relating to amateur radio and computing are welcome. Honorariums at a rate of $15 per printed page ($20 maximum per author per issue) are paid for original material accepted. Classified ads are free to members. Commercial ad inquiries are invited. The editor reserves the right to reject or edit any portions of the copy. Items should be mailed by the 8th of the preceeding month to Paul Rinaldo, W4RI, 1524 Springvale Ave, McLean, VA 22101. Full permission for reprinting or quoting items is granted provided that credit is given to both the author and the newsletter. Mailing to U.S. and possessions is by 3rd Class bulk mail. Canadian and Mexican addresses add US$2 for postage. Overseas readers add US$8 for air mail or US$2.30 for surface.

AMRAD officers for 1982 are:

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The AMRAD Library is operated by Tedd Riggs, KC4YN, 8402 Berea Ct, Vienna, VA 22180, 703-573-5067. Donations are tax-deductible.

Our CompuServe/Micronet number is [72345,1050], which is serviced by Bill Pala, WB4NFB.

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